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<p align="center"><b>Division of Forensic Science</b></p> <p align="center"><b>SAFETY MANUAL</b></p>	<p>Amendment Designator:</p>
	<p>Effective Date: 13-February-2004</p>
<p align="center"><b>5 PREVENTIVE/PROTECTIVE MEASURES</b></p> <p>To minimize/eliminate the hazards present at DFS, and address the corresponding applicable regulations and standards, an extensive, comprehensive and compliant system of engineering controls, personal protective equipment (PPE) and specific administrative requirements for work policies and practices has been developed. The system is designed to:</p> <ul style="list-style-type: none"> <li>• prevent the exposure of employees to those hazards, and</li> <li>• protect employees by minimizing/eliminating the amount of exposure in the event of failure of the preventive measures.</li> </ul> <p>The sections below describe DFS's general preventive/protective measures. More specific and/or additional details of many of these measures, as they apply to chemical and biological hazards, may be found in the Appendices of this manual, and in Section 8, dealing with Section specific issues.</p> <p><b>5.1 Engineering Controls</b></p> <p>The system begins with the design, construction, outfitting, equipping and maintenance of DFS' buildings.</p> <p>5.1.1 All buildings are designed, constructed and maintained in compliance with the Virginia Uniform Statewide Building Code (USBC), which incorporates numerous requirements that address physical and mechanical building safety issues.</p> <p>5.1.2 All electrical service and equipment meets the requirements of the National Electrical Code.</p> <p>5.1.3 To accommodate DFS' technical operations:</p> <ul style="list-style-type: none"> <li>• most ventilation systems supply 100% fresh air to laboratory areas, and maintain them at a positive pressure with respect to the administrative areas,</li> <li>• exhaust hoods and devices are incorporated into the ventilation systems to accommodate work with hazardous respirable materials,</li> <li>• specifically engineered rooms and areas are provided for storage of hazardous materials,</li> <li>• plumbed fixtures such as safety showers and eyewashes are built into or near the laboratory areas (Note that unplumbed eyewashes installed in areas where immediate access to a plumbed eyewash is not available must be considered as "backups". Individuals in those areas must be aware of the locations of the nearest plumbed eyewashes),</li> <li>• equipment such as fire extinguishers and blankets, spill control kits, and first aid supplies are located throughout each building.</li> </ul> <p>5.1.4 All health and safety (H&amp;S) related building components, fixtures, and equipment are inspected and/or maintained on a regular basis (see 5.3.1 below), and/or repaired/replaced as necessary.</p> <p><b>5.2 Personal Protective Equipment</b></p> <p>PPE is provided to employees to augment engineering controls or, when such controls are impractical or unnecessary, to comply with administrative requirements. PPE's primary function is to protect employees from hazards, but, when possible, equipment of different types, sizes and materials are made available to attempt to minimize the discomfort and hindrance to work that is inherent in most forms of PPE.</p> <p>5.2.1 Eye/Face Protection</p> <p>Safety glasses, goggles and/or face shields are provided to all employees who require protection of the eyes/face. Safety glasses meet the impact resistance requirements of American National Standards Institute Standard Z87.1-1989. Employees who wear prescription lenses are offered prescription safety glasses at DFS expense. Safety glasses made of appropriate materials are available for protection from radiative hazards such as ultraviolet light.</p>	

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<div data-bbox="199 296 524 327" data-label="Section-Header"> <p>5.2.2 Hand/Arm Protection</p> </div> <div data-bbox="297 359 1542 422" data-label="Text"> <p>Gloves (or mitts) are provided to all employees who require protection of the hands/arms. An assortment of gloves is available for protection from various hazards:</p> </div> <div data-bbox="297 453 1511 642" data-label="List-Group"> <ul style="list-style-type: none"> <li>• cloth and leather gloves are available for prevention of injuries from abrasions, scratches, cuts, etc., while working with power tools, heavy containers, broken glass, etc.,</li> <li>• non-asbestos insulating gloves are available for protection from heat; similar gloves are available for handling cryogenic materials, and</li> <li>• polymeric gloves (latex, nitrile, etc.) are available for protection from hazardous chemicals and/or infectious biological materials.</li> </ul> </div> <div data-bbox="199 667 469 699" data-label="Section-Header"> <p>5.2.3 Body Protection</p> </div> <div data-bbox="297 730 1511 825" data-label="Text"> <p>Laboratory coats are provided to all employees who require protection of the body, above that offered by street clothing, from unexpected incidental contact by chemicals or biological materials. Barrier clothing is provided for protection from expected and/or gross contact.</p> </div> <div data-bbox="199 850 597 882" data-label="Section-Header"> <p>5.2.4 Respiratory Tract Protection</p> </div> <div data-bbox="297 913 1542 976" data-label="Text"> <p>Respirators are provided to all employees who require protection of the respiratory tract. Details of DFS' Respiratory Protection Program may be found in Appendix C of this Manual.</p> </div> <div data-bbox="199 1001 557 1033" data-label="Section-Header"> <p>5.2.5 Ear (Hearing) Protection</p> </div> <div data-bbox="297 1064 1203 1096" data-label="Text"> <p>“Earmuffs” are provided to all employees who require protection of the ear (hearing).</p> </div> <div data-bbox="199 1121 459 1152" data-label="Section-Header"> <p>5.2.6 Foot Protection</p> </div> <div data-bbox="297 1184 1409 1215" data-label="Text"> <p>Shoes with safety toes, or safety caps, are provided to employees who regularly handle heavy containers.</p> </div> <div data-bbox="152 1247 537 1278" data-label="Section-Header"> <p><b>5.3 Administrative Requirements</b></p> </div> <div data-bbox="199 1310 610 1341" data-label="Section-Header"> <p>5.3.1 Management Responsibilities</p> </div> <div data-bbox="297 1373 1542 1436" data-label="Text"> <p>Although most H&amp;S work policies and practices apply to employees, management is responsible for complying with the following schedules for inspection/maintenance of building H&amp;S components, fixtures and equipment:</p> </div> <div data-bbox="297 1467 1511 1593" data-label="List-Group"> <ul style="list-style-type: none"> <li>• exhaust hoods shall be inspected by an outside agency annually,</li> <li>• plumbed eyewashes and showers are inspected every three and six months, respectively, and</li> <li>• fire extinguishers are inspected monthly, and annually by an outside agency, and are maintained by an outside agency every 5 years.</li> </ul> </div> <div data-bbox="199 1619 578 1650" data-label="Section-Header"> <p>5.3.2 Employee Responsibilities</p> </div> <div data-bbox="297 1682 487 1713" data-label="Section-Header"> <p>5.3.2.1 “Think!”</p> </div> <div data-bbox="391 1745 1542 1839" data-label="Text"> <p>The probability of exposure to a hazard can be minimized, or, in many cases, completely eliminated, by application of simple common sense. For example, employees should immediately recognize the following as obviously <u>bad</u> ideas, and avoid these and similar actions:</p> </div> <div data-bbox="391 1871 1154 1934" data-label="List-Group"> <ul style="list-style-type: none"> <li>• balancing on a wheeled chair to reach a high shelf,</li> <li>• spilling water on a well-traveled tile floor and not cleaning it up, or</li> </ul> </div>	

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<div> <ul style="list-style-type: none"> <li>• running with scissors.</li> </ul> <p>Similarly, all employees have been repeatedly exposed to, and should follow, numerous public safety messages such as:</p> <ul style="list-style-type: none"> <li>• “Don’t make “octopuses” out of electrical outlets”,</li> <li>• “Lift with your knees, not your back”, and</li> <li>• “Don’t point a gun at anyone”.</li> </ul> <p>5.3.2.2 Apply Experience, Education and Training</p> <p>Although the following sections prescribe many work policies, practices and prohibitions, their correct application largely depends on employees’ knowledge of the hazards present in their work. Employees must apply that knowledge, as acquired from experience, education and training, to ensure those measures are directed against all routes of potential exposure. Also, since much of the work performed at DFS involves potential exposure to multiple simultaneous hazards, those measures must be directed at all hazards.</p> <p>5.3.2.3 Working Alone</p> <p>For purposes of this Manual, working alone is defined as “any time work is done with no coworker present in the same Section; e. g., outside of normal work hours (evenings, weekends and holidays), or other times such as lunch, at the beginning and/or end of the work day due to an Alternate Work Schedule, or when Section coworkers are on leave.” The following types of work shall not be performed when working alone:</p> <ul style="list-style-type: none"> <li>• Discharging a firearm – A person outside the Section may monitor this process using a remote video camera or two way radio.</li> <li>• Using power tools or other types of mechanical devices which have the potential for causing serious injury. Examples include drill presses and lathes.</li> <li>• Using/handling quantities of hazardous chemicals in excess of 100 milliliters/grams.</li> <li>• Performing equipment/instrument repairs or maintenance which involves exposing energized high voltage/current sources or exposing the individual to any other type of potential danger.</li> </ul> <p>5.3.2.4 Requirements Related to Engineering Controls</p> <p>Employees must use engineering controls in an appropriate manner and avoid any practices that compromise the effectiveness of those controls.</p> <p>5.3.2.4.1 Ventilation, Exhaust Hoods, and Exhaust Devices</p> <p>Work involving hazardous respirable materials should be performed in an exhaust hood or under an exhaust device. Work in a hood should be performed in compliance with the following guidelines:</p> <ul style="list-style-type: none"> <li>• sashes on fume hoods should be kept as low as possible at all times; those on biological safety cabinets should be kept in the range marked on the cabinet,</li> <li>• work in hoods should be performed as far back in the hood as possible, and</li> <li>• hoods with moveable vents should be adjusted for the density of the hazardous material, if necessary.</li> </ul> </div>	

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<p>Because of the balance of exhaust hood flows with general building ventilation in some of the DFS buildings, doors connecting laboratory areas to biovestibules in those buildings must be kept closed when not in use.</p> <p>5.3.2.4.2 Hazardous Materials Storage Rooms and Areas</p> <p>Hazardous materials should be stored in appropriate rooms or areas. Storage of such materials must comply with applicable regulations, and should follow commonly accepted guidelines with respect to the type(s) of hazard and incompatibility of materials.</p> <p>5.3.2.4.2.1 Flammable and Combustible Materials</p> <p>Flammable and combustible chemicals will be stored in storage rooms or flammable storage cabinets.</p> <p>5.3.2.4.2.2 Corrosive Materials</p> <p>Corrosive materials should be stored in cabinets resistant to the material.</p> <p>5.3.2.4.2.3 Compressed Gases</p> <p>Compressed gas cylinders shall be stored (and handled) in a manner which prevents them from causing or sustaining physical damage. All pressurized gas lines must be labeled or color coded to identify their contents. If color coding is used, an explanatory chart must be present in that area.</p> <p>5.3.2.4.3 Health and Safety Fixtures and Equipment</p> <p>Access to H&amp;S fixtures and equipment should not be restricted by the placement of furniture or other items. Such equipment should be returned to its proper storage area after use. Use of consumable components of such equipment should be reported to the Safety Coordinator or Officer, so they can be replaced.</p> <p>5.3.2.5 Use of Personal Protective Equipment</p> <p>Employees must use PPE in an appropriate manner and avoid any practices that compromise the effectiveness of that equipment. PPE shall not be carried outside of laboratory areas.</p> <p>5.3.2.5.1 Eye/Face Protection</p> <p>Safety glasses, goggles and/or a face shield must be worn by any employee who requires protection of the eyes/face from physical/mechanical, airborne chemical and/or biological, and/or radiative hazards. Safety glasses with side shields provide adequate protection for most employees during routine work, but additional protection should be used as the degree of the hazard increases. Equipment made from appropriately absorbing materials must be used when employing radiation sources that can damage the eyes, i.e., lasers, and ultraviolet and intense visible and infrared light.</p> <p>5.3.2.5.2 Hand/Arm Protection</p> <p>Gloves (or mitts) must be worn by any employee who requires protection of the hands/arms from thermal, physical/mechanical, chemical and/or biological hazards. Gloves chosen must be appropriate for the hazard, i.e., provide the necessary protection. Although the choice of appropriate gloves is often obvious, e.g., cloth/leather for protection from cuts/abrasions,</p>	

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<p>choosing an appropriate glove when working with hazardous chemicals sometimes can be difficult. Employees are encouraged to consult with the Safety Coordinator/CHO when that information is not readily available from manufacturer's literature or similar sources. It may be necessary to wear two layers of gloves for adequate protection in certain circumstances. Employees washing glassware should wear substantial rubber gloves.</p> <p>Employees wearing gloves for protection from a hazardous material should be conscious of the possibility of transferring such a material to an item, e.g., a phone or a writing instrument, which will subsequently handled without gloves.</p> <p>5.3.2.5.3      Body Protection</p> <p>A laboratory coat must be worn by any employee who requires minimal protection of the body (and clothing) from unexpected contact with chemical or biological hazards. Any employee who expects such contact, or is working with particularly hazardous materials, should use more substantial protection such as a rubber apron.</p> <p>5.3.2.5.4      Respiratory Tract Protection</p> <p>A respirator must be worn by any employee who requires protection of the respiratory tract from chemical hazards. Details of DFS' Respiratory Protection Program may be found in Appendix C of this Manual.</p> <p>5.3.2.5.5      Ear (Hearing) Protection</p> <p>"Earmuffs" must be worn by any employee who requires protection of the ear (hearing). Earmuffs must be worn for protection from very loud, short duration sounds, such as gunshot reports, or moderately loud, continuous sounds, such as that produced by some mechanical equipment.</p> <p>5.3.2.5.6      Foot Protection</p> <p>Shoes with safety toes, or safety caps, must be worn by any employee who regularly handles heavy containers.</p> <p>5.3.2.6      Other Requirements and Prohibitions</p> <p>5.3.2.6.1      All areas should be maintained in a neat and orderly condition.</p> <p>5.3.2.6.2      Eating, drinking, and smoking are prohibited in laboratory and evidence storage/receiving areas. Food and drinks may not be stored in those areas.</p> <p>5.3.2.6.3      "Transitional" areas, such as biovestibules, shall not be used for storage of food and drinks unless those materials are in an enclosed space such as refrigerator or a cabinet. Cups, plates, utensils and similar items should not be left out in such areas.</p> <p>5.3.2.6.4      Open toe and open weave shoes are prohibited in the laboratory.</p> <p>5.3.2.6.5      Headphones/earphones may only be used at volumes which do not interfere with hearing important sounds or communications.</p> <p>5.3.2.6.6      Equipment shall be used in a manner compatible with its design and function, and may not be used in a manner that compromises its safe operation. Equipment which is damaged in a manner which compromises its safe use may not be used. Equipment safety features may not</p>	

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<p>be overridden or modified. All equipment maintenance and repairs must be performed by qualified personnel. Emergency shutdown procedures must be posted on or adjacent to equipment which would pose a hazard if shut down improperly.</p> <p>5.3.3 Information and Training</p> <p>In addition to the information and training requirements in the Appendices, each employee shall also receive general information and training in such matters as locations of H&amp;S equipment, and specific information and training pertaining to their day to day work activities and duties. Much of this is accomplished by requiring that each employee read the applicable Safety Manual sections and Administrative and Regional Operating procedures, but the remainder is largely the employee's supervisor's responsibility. Exceptions to this include the specific training required for those employees who are members of a First Aid Team, clean up hazardous spills, and/or authorized to use fire extinguishers, and those assigned specific duties in building evacuations (pertinent Regional Operating Procedures).</p> <p>5.3.4 Inspections</p> <p>In addition to those inspections noted above in section 5.3.1, the Safety Coordinator will perform a minimum of one complete formal inspection of each Division Laboratory each year. Safety Officers will also perform a minimum of one inspection of their laboratory each year. A checklist will be used to guide and document those inspections.</p> <p style="text-align: right;">◆End</p>	